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Feature Article - Are Recent Labour Force Estimates Really More Volatile

INTRODUCTION

Large monthly movements in employment and unemployment have from time to time attracted the attention of some commentators and labour market analysts, raising the question of whether the volatility of the series has increased in recent years. This article shows that the seasonally adjusted estimates derived from the monthly Labour Force Survey (LFS) have not increased their volatility in recent times.

THE VOLATILITY IN THE SEASONALLY ADJUSTED ESTIMATES AT FIRST GLANCE

A time series can generally be decomposed into three broad components: the seasonal, the irregular, and the trend components. Seasonal adjustment is a means of removing the estimated effects of normal seasonal variation from the series so that the effects of other influences on the series can be more clearly recognised. However, seasonal adjustment does not aim to remove the irregular or non-seasonal influences which may be present in any particular period. This means that the seasonally adjusted series can often show volatile month-to-month movements, and these movements may not be reliable indicators of the underlying trend behaviour of the series.

Graphs 1 and **2** show the monthly percentage movements in the seasonally adjusted estimates of persons employed and unemployed, respectively. Inspection of the graphs shows that both series have displayed volatile monthly movements. However, neither series has become appreciably more volatile in the recent years. The information from these graphs provide a first impression of the volatility of the series, but the measure of volatility can be further refined.

GRAPH 1: EMPLOYED PERSONS, AUSTRALIA, SEASONALLY ADJUSTED MONTHLY PERCENTAGE MOVEMENTSGraph: Shows the seasonally adjusted monthly percent movement for the employed persons series
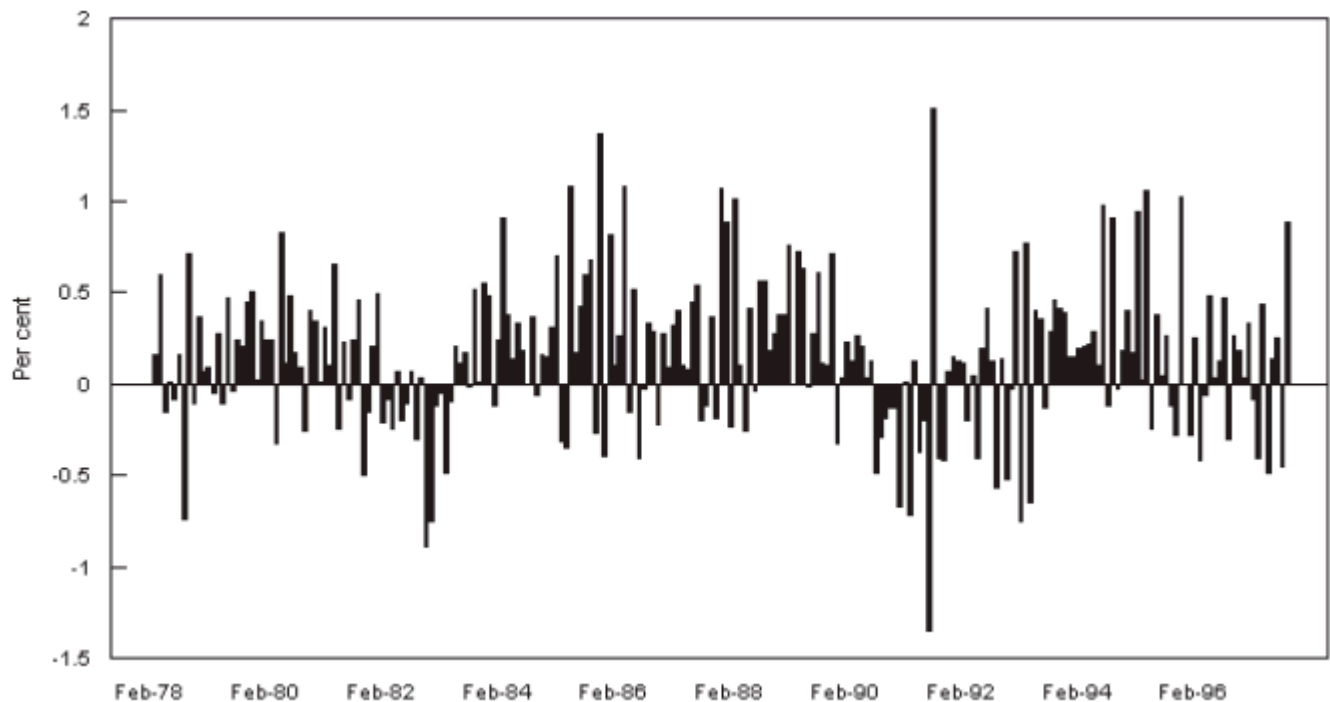
GRAPH 2: UNEMPLOYED PERSONS, AUSTRALIA, SEASONALLY ADJUSTED MONTHLY PERCENTAGE MOVEMENTS
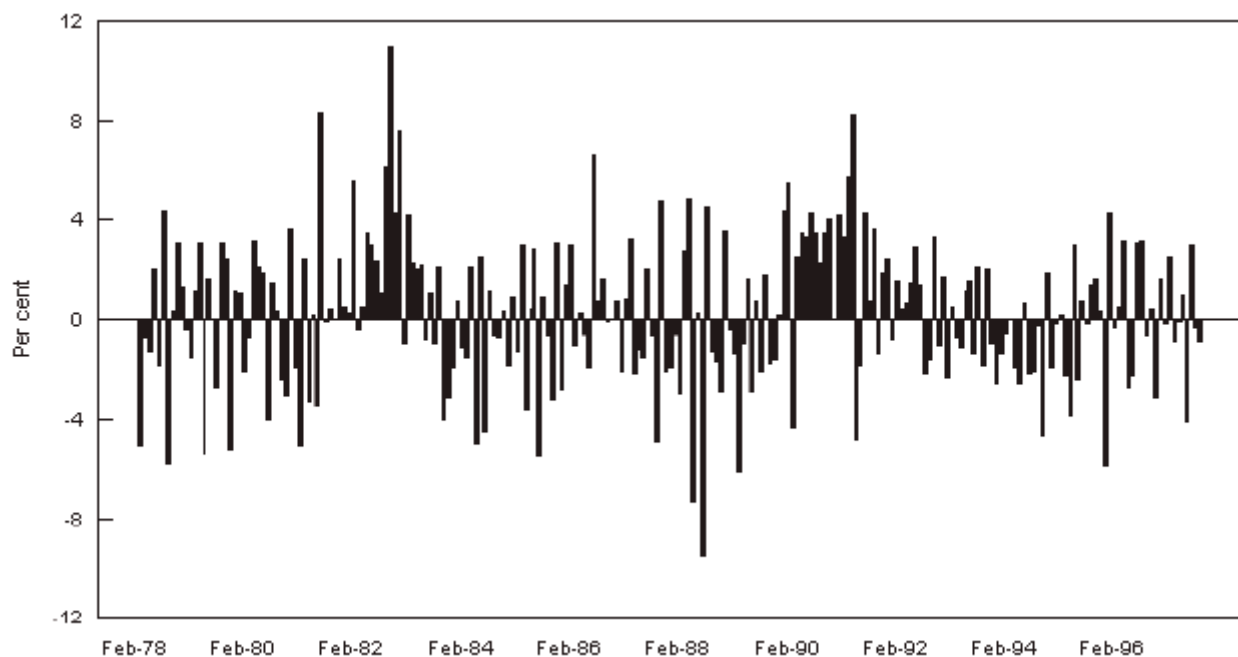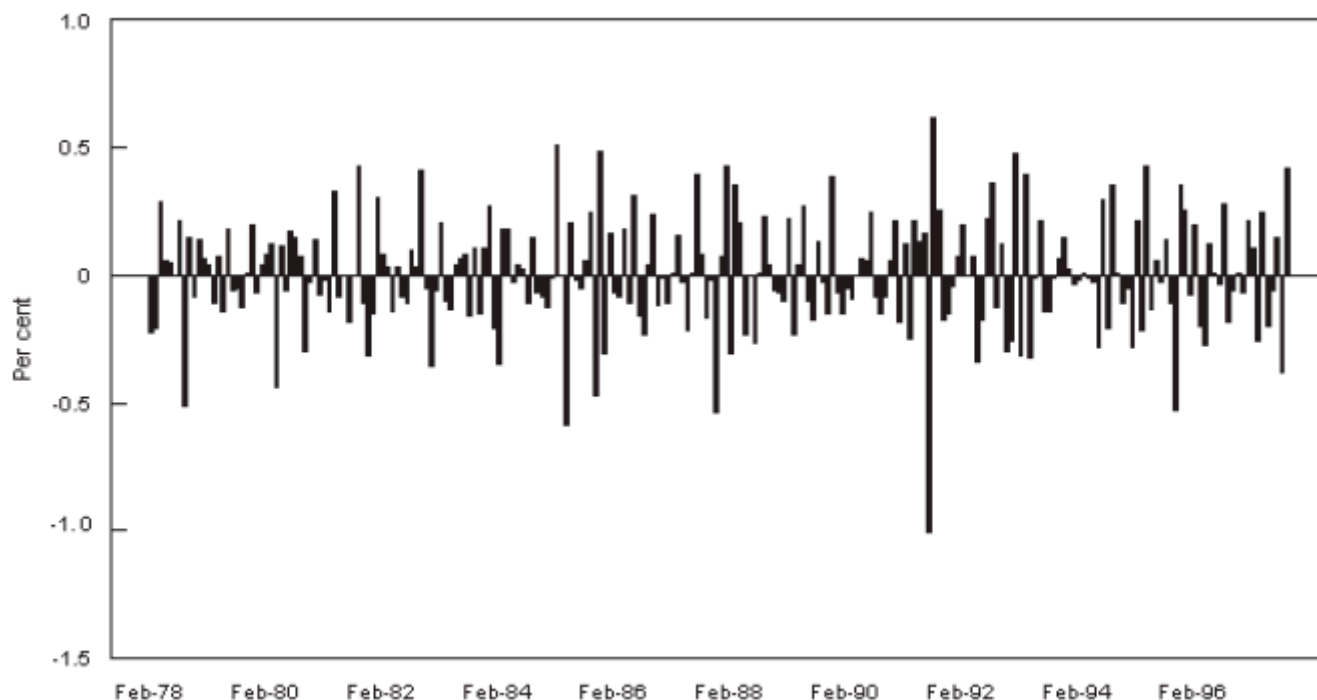

A MORE PRECISE MEASURE OF VOLATILITY

A more precise measure of volatility can be obtained by examining the irregular component in the seasonally adjusted estimates, which can be easily derived using the published data. The irregular component can be obtained by subtracting the trend estimate from the seasonally adjusted, i.e. Irregular (I) = Seasonally Adjusted (SA) - Trend (T). This gives a simple estimate of the irregular component of the series, which is expressed as thousands of persons.

Alternatively, we can express the irregular component in percentage terms by dividing it by the trend estimate and multiplying it by 100, i.e. (SA - T)/ T *100. This measure takes into account

the growth in population, and changes in employment and unemployment over the nineteen years' span of data being considered here. **Graphs 3** and **4** show the irregular component using this method for persons employed and unemployed, respectively.

GRAPH 3: EMPLOYED PERSONS, AUSTRALIA, (SEASONALLY ADJUSTED - TREND) / TREND

GRAPH 4: UNEMPLOYED PERSONS, AUSTRALIA, (SEASONALLY ADJUSTED - TREND) / TREND
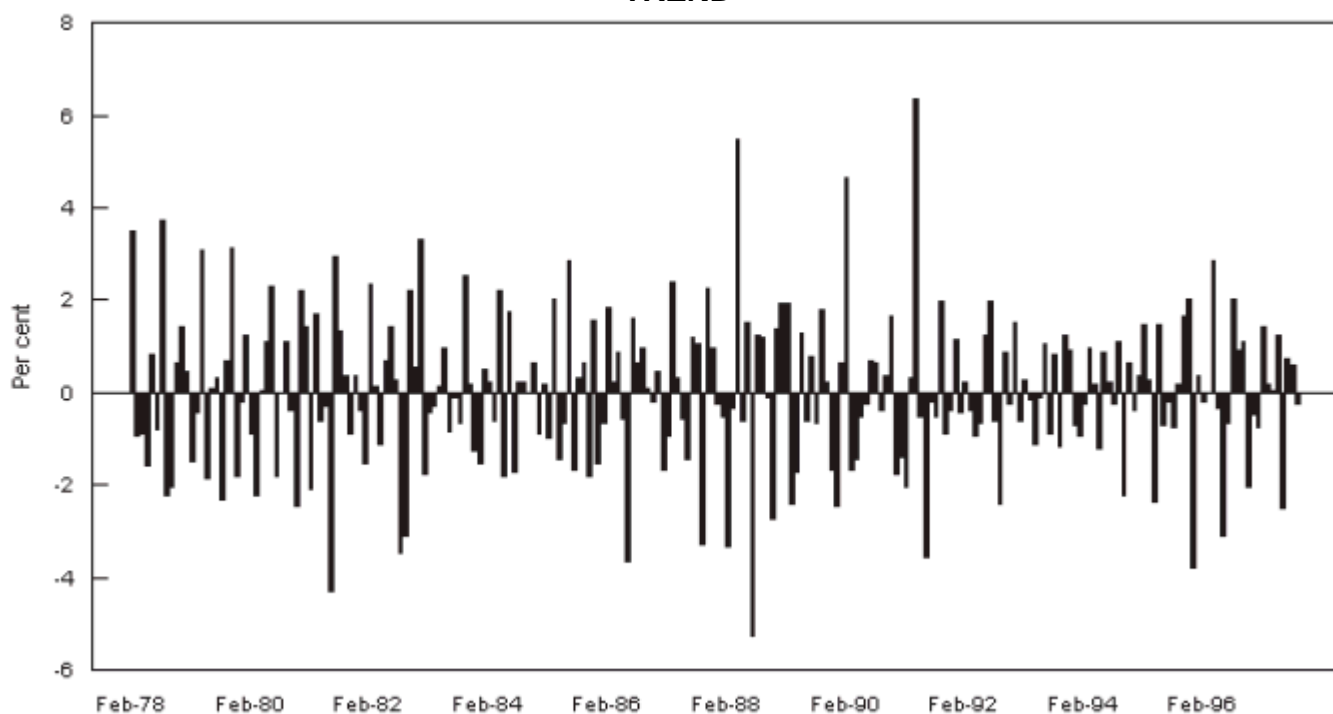

THE SEASONALLY ADJUSTED ESTIMATES HAVE NOT BECOME MORE VOLATILE THAN IN THE PAST

These more precise measures of volatility show that the seasonally adjusted series is not now appreciably more volatile than in recent years. **Graphs 3** and **4** show that marked volatility has occurred from time to time for both persons employed and unemployed. However, by and large there has been no appreciable increase in the size of the irregular component in either of the two series in recent years. This is consistent with the observations from **Graphs 1** and **2**.

DIFFERENCES IN THE DEGREE OF VOLATILITY BETWEEN THE CALENDAR MONTHS OF THE YEAR

The issue of volatility can be further examined by looking at the irregular component for each month of the year to see if some months are more volatile than others. The curves in **Graphs 5** and **6** represent the seasonal component for each month of the year for employed persons and unemployed persons, respectively. The observations for each month are one year apart, e.g. the last three observations on the curve represent the seasonal component for that particular month over the last three years. The vertical lines between the curve and the arrow heads represent the irregular component, and, the higher the degree of volatility, the longer the line. Both graphs have been estimated with data from February 1978 to September 1997.
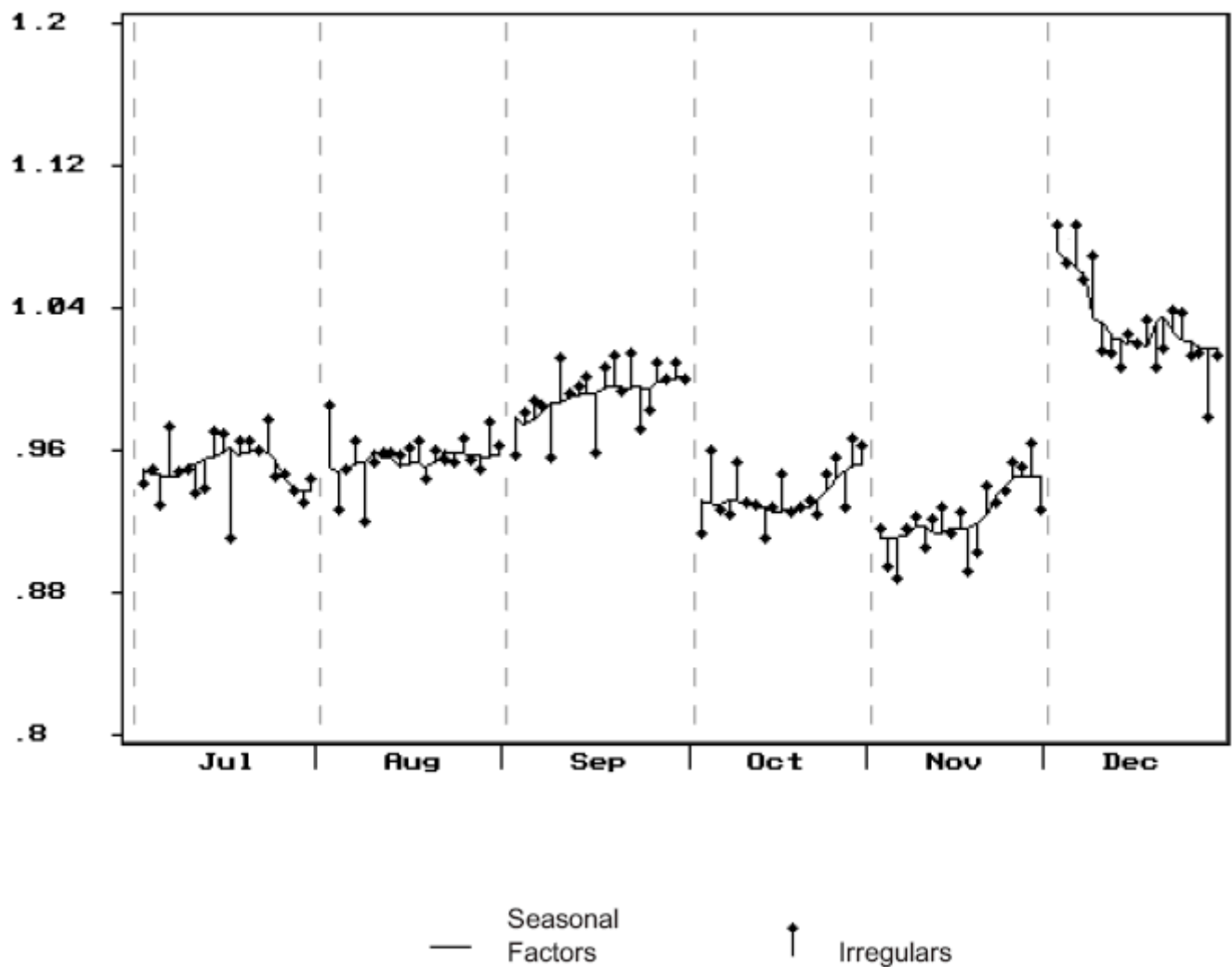
GRAPH 5: EMPLOYED PERSONS, AUSTRALIA, SEASONAL FACTORS AND IRREGULARS

Legend:
— Seasonal Factors
↑ Irregulars
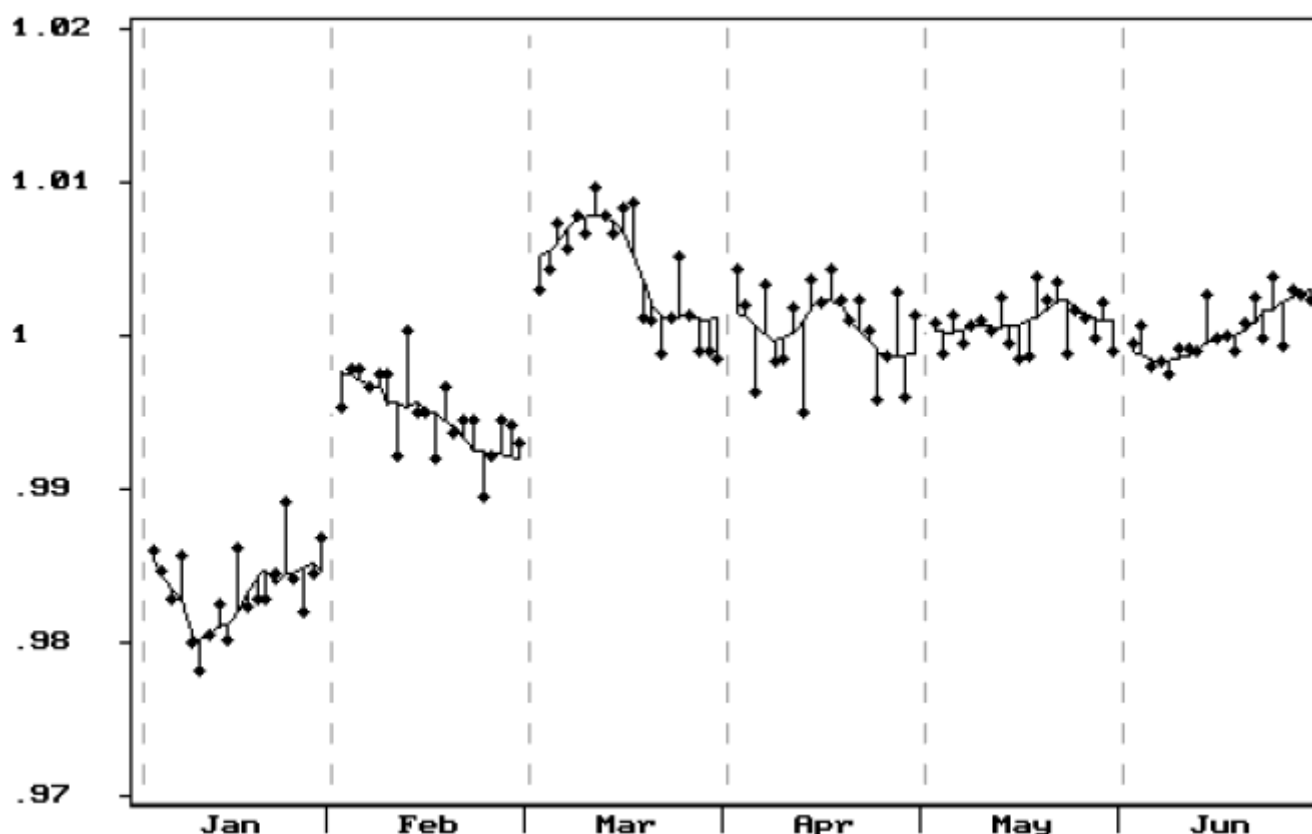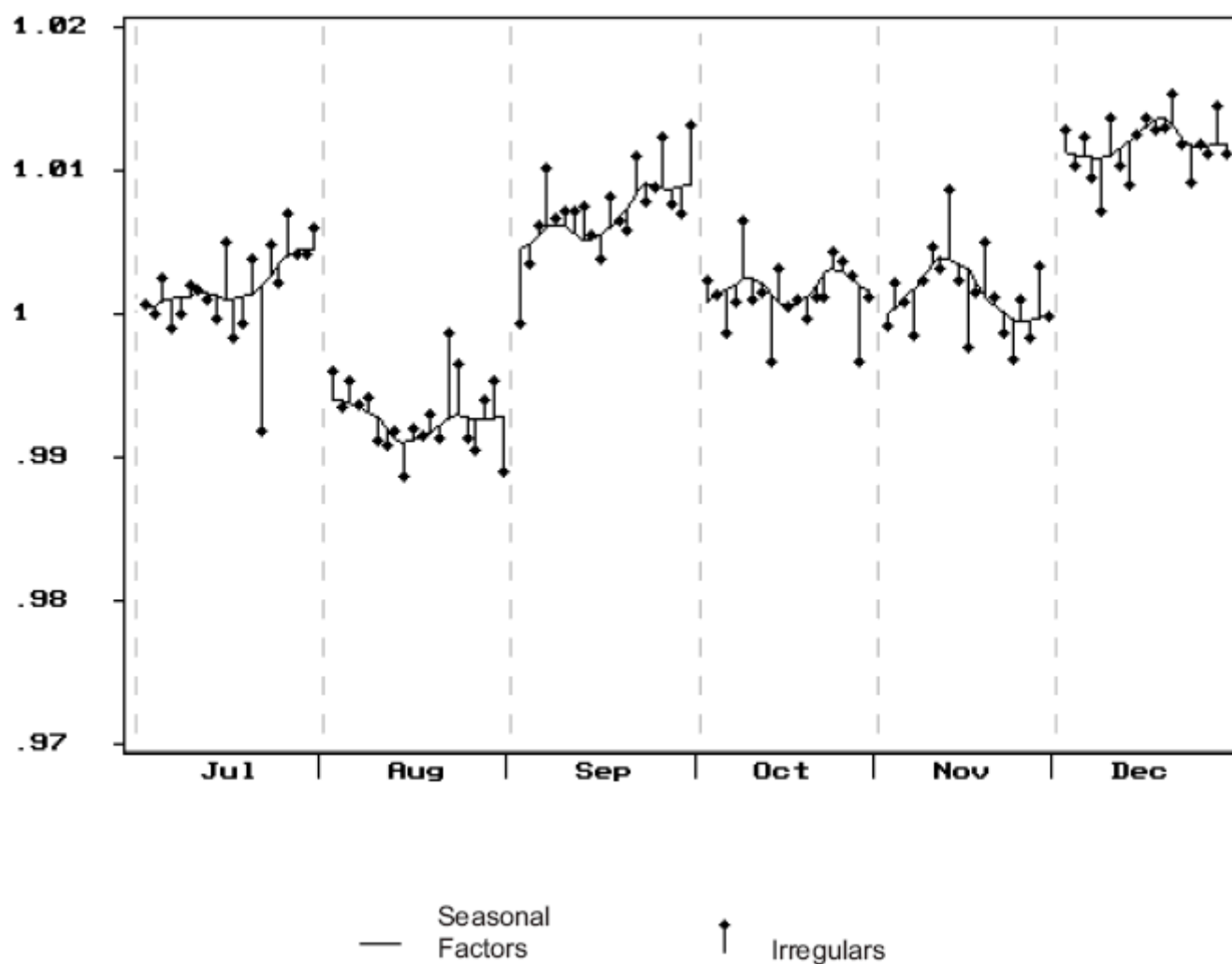
GRAPH 6: UNEMPLOYED PERSONS, AUSTRALIA, SEASONAL FACTORS AND IRREGULARS

Seasonal Factors — Irregulars ↑
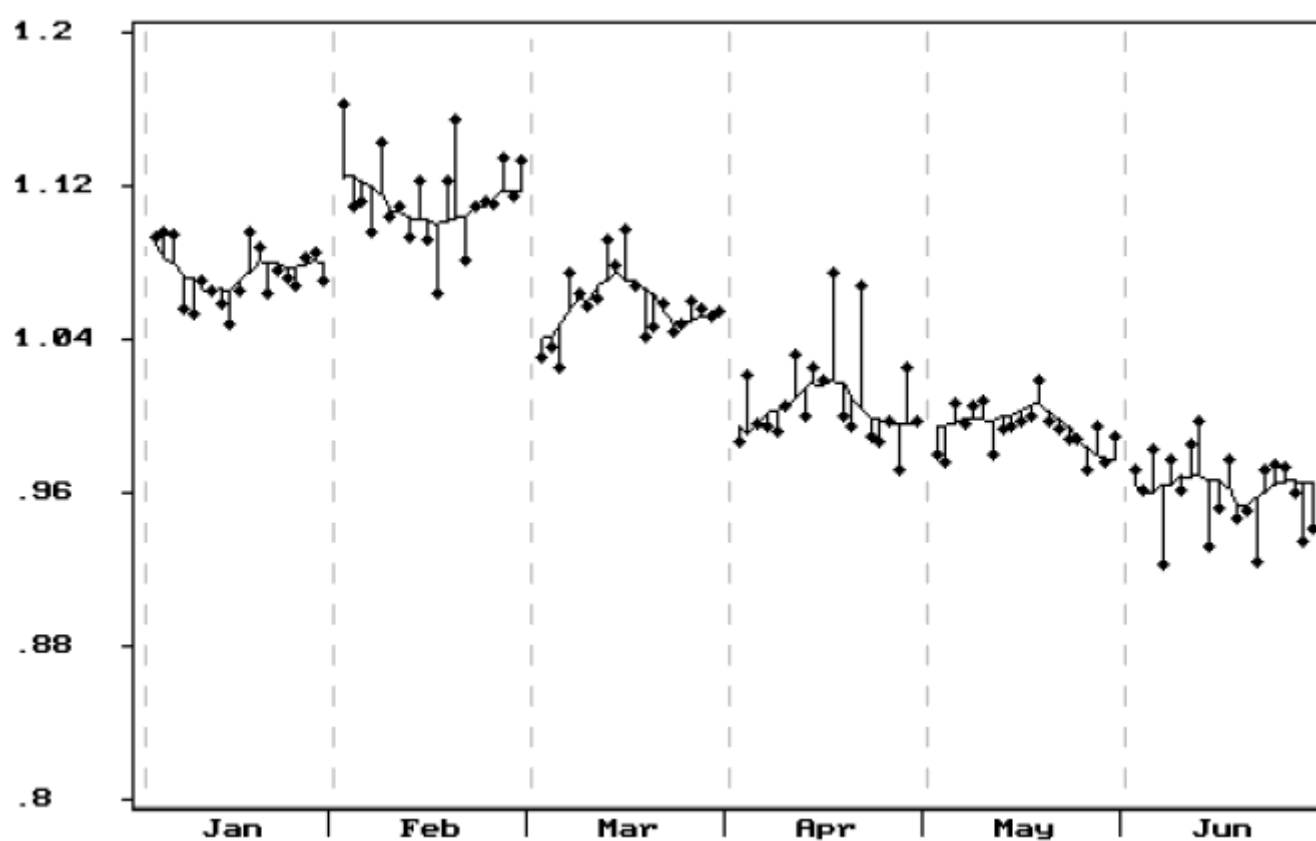
It can be seen in **Graph 5** that for persons employed, no month is highly volatile. The largest irregular was recorded in July 1991, but apart from that single incident, July is no more volatile than the other months. The large irregular in July 1991 is thought to be the result of changes that were made to the supplementary survey program, which disturbed the seasonal adjustment factors. **Graph 5** also shows that May and June are relatively non-volatile, with most of their seasonal and irregular components being quite close to the seasonal factor paths. Overall, none of the individual months shows a systematic increase in volatility in recent years.

With regard to persons unemployed, **Graph 6** shows that although April has recorded the two largest irregulars in the series, February appears to be the most volatile. January, May, and August are relatively non-volatile. As with the series for persons employed, none of the individual months showed a systematic increase in volatility in recent years.

MORE FORMAL STATISTICAL TESTS ON VOLATILITY

More formal statistical tests on volatility show that the observed values of the irregulars match very well with the statistical distribution that would be expected from a purely random process. Further details can be found in the accompanying technical note.

THE TREND ESTIMATES

The ABS's trend estimates are obtained by smoothing the seasonally adjusted series using the Henderson moving average method. This filtering process removes the irregular component, and hence provides useful information about the underlying movements in a time series, which can be harder to ascertain from either the original or the seasonally adjusted estimates. In fact, analyses of monthly LFS series indicate that the month to month movement in the seasonally adjusted series is mostly attributed to the irregular component which is not related to the trend. The irregular component accounts for more than half the seasonally adjusted month to month movement with the following frequency:

- Employment -
  5 in 10 monthly movements;

- Unemployment -
  7 in 10 monthly movements;

- Unemployment rate -
  7 in 10 monthly movements; and

- Participation rate -
  9 in 10 monthly movements.

CONCLUSIONS

Analyses of monthly LFS series indicate that the month to month movement in the seasonally adjusted series is mostly attributed to the irregular component which is not related to the trend. Therefore, more often than not, examining the month to month movements in the seasonally adjusted LFS series is an approximation to examining the volatility attributed to the irregular component in the series. For this reason, the ABS encourages users to place greater emphasis on the trend estimate when inferences are drawn about the underlying direction or behaviour of particular statistical series.

This feature article was contributed by Cynthia Kim, ABS.